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MAQUOKETA SHALES IN DELAWARE COUNTY.

BY SAMUEL CALVIN.

(Abstract.)

From the relation of Delaware county to the great Niagara escarpment it would scarcely be expected that rocks older than the Upper Silurian would be found within its limits. Upper Silurian sediments indeed constitute the rocks that may be said to be normal to the entire county. They cover probably ninety-nine per cent of its area. Without exception all the higher lands are occupied by them, and most of the valleys have a floor of Niagara dolomite. Still some of the valleys have cut through the Niagara limestone down into the underlying shales of the Maquoketa age, and very many of the valleys come much nearer to exposing Maquoketa shales than has hitherto been supposed. The normal dip of the Iowa strata to the southwest is evidently reversed along a line that passes obliquely near the northeast corner of the county, so that the Maquoketa shales are covered with a relatively thin veneer of Upper Silurian dolomite, even as far as the western border of the county in the northwestern corner.

Northeast of Colesburg the valleys of some small creeks, tributary to the Turkey river, have cut through the Niagara, and exposed the Maquoketa shales at an altitude 200 feet lower than the ridge on which the village is situated. A section of the shale more than 50 feet in thickness is exposed in sections 1 and 2 of the northeast township of the county. The shales at this point are composed of blue, plastic clay. They are non-fossiliferous, and are well adapted to the manufacture of pottery, a use to which they are put on a limited scale by Mr. Frank Brock, of Colesburg.

In section 2 a large spring issues from the side of the hill at a level corresponding to the top of the blue shales. Above the level of the shales there are 25 feet of rather thin-bedded,

impure limestone that breaks up on exposure to the weather into many small angular fragments. These are the beds of passage, and they are followed by heavy-bedded dolomite of the Niagara age.

At Colesburg the well at the hotel was drilled through 60 feet of loess, 10 feet of flint and red clay, which evidently embraces the residual cherts and clays of the geest; and through 183 feet of Niagara limestone and beds of passage to the blue shales of the Maquoketa age. Water was found at the top of the shale. The dip at Colesburg is normal. The synclinal axis already referred to evidently lies a little to the west.

About six miles southwest of Colesburg, in the southern edge of section 2, T. 90 N., R. IV W., the valley of Elk creek, has been eroded down into the shale and furnishes some fine exposures. As before the shale is non-fossiliferous, and admirably adapted to the manufacture of pottery. Exposures occur at intervals for a mile or two up and down the creek from the point described above.

At a number of points in the valley northeast of Greeley the beds of passage which lie immediately above the blue shales of the Maquoketa, are exposed and exhibit their usual characteristics.

The shales themselves are not seen. The best example of the beds of passage is seen at the mill at Rockville. At this point they were found to contain a few fossils belonging to Hudson river types, which shows that the lower part, at least, of these beds must be referred to the Maquoketa rather than the Niagara age. Lithologically they resemble some portions of the Niagara, but the contained fauna is Ordovicia or Lower Silurian.

The blue argillaceous shales are not naturally exposed at Rockville, but the water pouring over the dam has excavated a deep pit as the result of the plunge, scooping out great masses of the shaley portions of the beds and piling them up in heaps and ridges a short distance below. These heaps contain many beautiful fossil-bearing shales, and in the multitude of finely preserved individuals we recognize *Orthis testudinaria*, *Plectambonites sericea*, *Strophomena filitexta*, *Strophomena rugosa*, *Zygospira modesta* and *Calymene senaria*. In the varietal characters, mode of preservation and association of the species, the slabs from Rockville could not be distinguished from specimens of corresponding character collected at Cincinnati, Ohio.

Wells drilled on the higher ground at Hopkinton, reach the Maquoketa shales at a depth of 90 feet. The bed of the river at the mill at South Hopkinton, must be within a few feet of the shales. Owing to the reversal of the dip the Pentamerus beds that are exposed at the surface at Hopkinton are found at "Devil's Back Bone," in northwestern Delaware, and the cleft casts of the ventral valve are known to the summer visitors of that somewhat noted locality, as the "Devil's Claws". The same beds extend over into northeastern Buchanan, and anywhere in that region the shales may be reached at a depth of about 100 feet.

The proximity of the shales to the surface over so wide an area is not without its economic significance. The surface of the shales is everywhere a water-bearing horizon, and so unfailing wells may be obtained over many square miles by boring to only a moderate depth. The drouth of last summer has turned the attention of farmers, especially the cultivators of vegetables and small fruits, to the desirability and practicability of irrigation, and there has been manifested a very general desire for information as to the depth at which unfailing supplies of water may be reached. The next summer will witness some practical experiments in this direction, particularly at Hopkinton, and the water supply, it is expected, will be found in the Maquoketa shales.

OCCURRENCE OF MEGALOMUS CANADENSIS, HALL, IN THE LECLAIRE BEDS AT PORT BYRON, ILLINOIS.

BY WILLIAM HARMON NORTON.

This common fossil of the Guelph of Canada has not been noted in the Le Claire beds of Iowa, or their immediate extension into adjacent states. Its occurence, therefore, at Port Byron, Illinois, in the Barrett quarries one and one-half miles north of the town, is of special interest, since it shows a range